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ABSENCE OF RESONANCE IN THE FIFTH RIGHT INTER-COSTAL SPACE DIAGNOSTIC OF PERICARDIAL EFFUSION.¹

BY T. M. ROTCH, M. D., BOSTON.

My attention was first directed to the investigation of the commonly received views concerning the area of dullness in pericardial effusion by the numerous cases of effusion into the pericardium found at post-mortem examinations, where such effusion had not been diagnosticated during life, although the patients had been in the hands of most competent clinical diagnosticians.

On inquiry, I learned from very careful investigators that the rules laid down by authorities on this subject were often totally inadequate for purposes of diagnosis, and the opinion of these physicians is well represented when expressed in the words of Professor Calvin Ellis, who, when questioned regarding the subject, said that "he thought the rules laid down by authors for determining pericardial effusion by the pyramidal form of the area of flatness misleading and insufficient." Dr. Henry I. Bowditch also concurs in this opinion.

Influenced by the experience of these eminent physicians, I began, about nine months ago, a series of experiments, to determine, if possible, the actual shape which the effusion, when present, *does* take, and the results of these experiments will be given in this paper.

What, then, are the views held upon this subject by the numerous authorities who have written about it since Galen, Forestus, and Rondelet first spoke of pericardial effusion? Albertini and in like manner Morgagni mention the difficulties presented in the diagnosis, while Auenbrügger first gave the symptom of precordial percussion dullness, Laennec at the same time doubting the possibility of diagnostinating pericardial effusion with any certainty; and this author did not recognize the disease by percussion, Louis being the first French author who speaks of it, while precordial dullness, as a symptom, is first elaborately described by Skoda and Kolletschka.

We will not here consider the various complications of the disease which may arise and render its diagnosis of greater difficulty; these I

¹ Read at the Annual Meeting of the Massachusetts Medical Society, June 11, 1878.

expect to speak of in a future paper, considering at present merely the diagnosis by percussion of a simple serous or sero-fibrinous effusion into the pericardium, with the heart healthy or diseased as a complication, but the lungs and pleura normal, no adhesions, and in fact nothing else abnormal in the thorax or abdomen.

Reviewing the ideas of representative authors on this subject, first, Skoda writes: "It is necessary to have a large amount of fluid to cause an increase of dullness. The dullness depends on the amount of retraction of the lung.

"As the heart is heavier, that is, has a greater specific gravity than any exuded fluid, it lies as deeply as possible, the fluid standing as high as possible; this is when the fluid is in small amount, and is always the case excepting when the pericardium is relaxed, or when adhesions are present in the upper part of the pericardium. Thus at first, when the amount of fluid is comparatively small, the increase of the dullness is vertical, that is, in the long diameter of the heart, while increase in breadth only takes place after the amount of fluid has increased still further; and when it reaches one thousand cubic centimetres, as a rule, the percussion dullness extends from the second left costal cartilage to the lower edge of the thorax, and in breadth from the right edge of the middle piece of the sternum to the left axillary line."

Stoffela, reporting Oppolzer's lectures, says: "The symptoms of pericardial effusion are in some cases very evident, while in others they are so unpronounced as to cause the greatest difficulty in the diagnosis. Percussion shows that the exudation begins at the base of the heart, where the great vessels join the heart; and hence as the pericardium at this point is most relaxed, so the fluid collects here first and is first found here by percussion, thus increasing the long diameter of the heart, reaching as high as the third or second rib, in the left parasternal line. Then, on the fluid increasing, we find the dullness increased in breadth, that is, extending from the right edge of the sternum across to the left mammary line; this area of dullness has the form of an inverted triangle, its base being upwards and its squared apex downwards. Then, on further increase of the effusion, the dullness can extend up to the first rib, and the figure becomes less and less like a triangle; but, as it increases, the fluid fills up the lower part of the pericardium, and we now have a triangle, with the base downwards and its truncated apex above."

Professor Bauer says "that the effusion first collects at the base of the heart, pushing that organ downwards before it; that the dullness has in a majority of cases a certain form, namely, that of a truncated cone with the base downwards;" and he disagrees with Duchek, who holds "that the form of the area of dullness is determined by the lungs retracting," while Bauer contends "that it is the shape of the pericar-

dium itself which governs this form." Bauer also says "that in large exudations the triangle reaches to the second or third rib on the left of the sternum; that at times the whole sternum may be dull; that the left side of the triangle may extend beyond the left nipple to the axillary line, and that this may also occur on the right side. Usually, however, the dullness extends very little to the right of the sternum, and the effusion must have reached one hundred cubic centimetres in quantity before a diagnosis can be made."

Paul Niemeyer states that the exudation is first perceptible by percussion when it has reached two hundred and fifty cubic centimetres, and both he and Kunze agree with Oppolzer as to the form of the area of percussion dullness, while Guttmann, Felix Niemeyer, Gerhardt, Jaccoud, and Gee appear to agree with the views of Skoda on this point.

Sibson, writing in Reynolds's System of Medicine, says: "The fluid collects in the lower part of the pericardium, pushing the heart up, so that the apex is above and beyond the nipple, and when the effusion is large it assumes a pyramidal or pear shape." He also considers, as does Gee, that it is the vertical increase of dullness which is characteristic of pericardial effusion, as affording the means of diagnosis from an enlarged heart.

Da Costa states that the shape is "pyramidal," with the base downwards, while Flint speaks of the area of dullness as "pyriform," with the apex at the sternal notch, and the base at the sixth or seventh cartilage, the left boundary extending as far as the left nipple, and the right over the right edge of the sternum.

The rules for making the diagnosis of pericardial effusion, then, being exactly laid down by these authors, have they, or have they not, proved adequate, practically, for such diagnosis? The following instances will, it seems to me, tend to show that they have not.

First, I would cite the case reported to me by Professor Ellis, where the diagnosis of pericardial effusion was made by one of the best trained of his advanced students, strictly according to rule, and so logically drawn up that Professor Ellis could not gainsay the diagnosis so long as he admitted the triangular form of flatness to be characteristic of pericardial effusion; and yet there was no doubt, judging by other prominent symptoms, that the area of increased praecordial flatness was caused by an enlarged heart.

Next, by permission of Dr. T. B. Curtis, I will read an extract from his letter to me on this subject, giving his reasons for doubting the correctness of the established rules for diagnostinating effusion. Dr. Curtis says: "When I was serving as interne in 1870 at the Hôpital des Enfants malades, under Dr. Henri Roger, there was in one of his beds a little girl about five years old who presented all the signs of an abun-

dant chronic effusion into the pericardial cavity. We had her several weeks under observation, and she was an object of particular interest to Dr. Roger, for the reason that he had already previously practiced puncture of the pericardium in a well-known case (published in the *Union médicale*, December, 1868), and was extremely desirous of an opportunity to repeat the procedure.

"In this case indications of the operation seemed to present themselves again, at times in the most urgent manner. Repeatedly I saw Dr. Roger mark out the area of dullness in his usual minutely careful way, and select the exact spot where he would insert the trocar. Before deciding to operate he consulted Dr. Labric, who was also attached to the Children's Hospital, and for whose judgment he had the highest regard. The latter, however, persistently advised against the proposed puncture, and in deference to his opinion the operation was postponed, until finally the child succumbed, without the operation having been performed. At the autopsy we found no effusion, but an enormously dilated heart.

"So closely, then, in this case were the signs of a copious pericardial effusion simulated by dilatation of the heart as to deceive one so skillful as Dr. Roger, fortified by an experience of nineteen years as physician to the Children's Hospital, a virtuoso in the art of physical examination, the author together with Dr. Barth of a well-known treatise on auscultation and percussion, and also author of a treatise on the semeiology of childhood."

Allowing that the heart has been tapped by mistake, by Baizeau and Roger, and blood withdrawn from the right ventricle without apparent harm to the patient, yet this accident is not by any means devoid of danger; and to show the great risk incurred in tapping the heart to the left of the sternum, with only our present knowledge of the signs of effusion, I will present one more instance of unsuccessful diagnosis. In the *Gazette des Hôpitaux*, No. 39, there is reported the case of a soldier in the military hospital of Groscaillon, who exhibited symptoms of pericardial effusion and disease of the aortic valves following from attacks of acute articular rheumatism. The dyspnœa led the surgeons to introduce a No. 1 Potain needle in the third left intercostal space to the depth of four centimetres. No fluid appeared, and on leaving the needle free it oscillated synchronously with the beat of the heart, which had been punctured; the patient uttered a sharp cry, took one deep inspiration, and was dead. The pericardium was found to be much thickened and adherent to the heart at various points. The needle had passed over one of these points and wounded the central organ.

The experiments which I am about to present to you were performed in the physiological laboratory of Professor H. P. Bowditch, and were all submitted to his inspection. I am greatly indebted for very valu-

able suggestions from Professor Bowditch, from his assistant Dr. Garland, and from Dr. James J. Putnam.

My first experiments were made upon dogs, but were failures, as to any notable results, for the following reasons: (1) That the dog's pericardium has not the same shape as the human pericardium; (2) that it hangs more vertically in the thorax; and (3) that owing to the pleura meeting directly in the median line of the sternum, and to the existence of an extra pleural cavity under the heart (first spoken of by Dr. Garland), it is impossible to enter the pericardium without opening the pleural cavity and causing collapse of the lung, an accident which materially alters the shape which the fluid may assume.

It was therefore thought best to use the cadaver only; for here we can introduce fluid into the pericardium without destroying the relations between the lungs and the heart which exist during life; it was also found by dissection that the anatomy of the infant's thoracic organs corresponds so very nearly to that of the adult's that the introduction of fluid into the infant's pericardium was followed by the same relative results as that into the adult's.

My results are based upon the injections of sixteen infants and four adults. The fluid used was melted cocoa butter, which has a specific gravity of 0.90. It will be well to state here that I use the term flatness to express entire absence of resonance, or what is understood by some German authors as "absolute dullness." By relative dullness I mean diminished resonance. Thus when I speak of the *flatness* of the heart or effusion, I mean that no lung tissue whatever is between the pleximeter and such heart or effusion; while where there is more or less lung tissue, I use the term *relative dullness*. Now as opinions are much more apt to differ as to relative dullness than as to flatness, it is the *area of flatness* which I shall mark out as characteristic of effusion; and I would also add that in order to mark out the boundary of the area of flatness correctly we must percuss very lightly from a point of established flatness, such as the fifth left costal cartilage, to the right and left and upwards, until we come to the encircling resonant border of the lung.

It is needless to mention the various methods of entering the pericardium which were employed before satisfactory results could be obtained; it is sufficient to state that although by sawing the sternum in the median line the pericardium can be entered without perforating the pleural cavity, yet that by this method the results of percussion are rendered void by air not only entering the anterior mediastinum, but also getting into the pericardium itself.

(*To be concluded.*)

DETERMINATION OF SEX BY THE DATE OF CONCEPTION.

BY J. B. SWIFT, M. D. HARV.

WHILE studying the reproductive organs in the microscopical laboratory of Dr. Carl Heitzmann, of New York, last winter, Dr. Heitzmann advanced the following theory in regard to the determination of the sexes. The ovum represents the female element, the spermatozoa the male. We know that it requires only a few spermatozoa, perhaps a single spermatozoon, to impregnate an ovum. If an ovum becomes impregnated by a few spermatozoa the female element will be in excess and the result will be a female. If, on the other hand, a good many spermatozoa impregnate the ovum the male element will preponderate, and a male will result. Now, if an ovum is high up, that is in the ovary or at the fimbriated extremity of the Fallopian tube, probably only a few spermatozoa will come in contact with it. But if the ovum is low down then many spermatozoa come in contact with it.

If menstruation and ovulation are dependent the one on the other, as many authorities affirm, then the situation of the ovum may be determined by the menstrual period. During the interval between the periods the ovum is in the ovary. Just before the flow begins the ovum may be on the surface of the ovary or in the fimbriated extremity of the Fallopian tube. As menstruation goes on the ovum descends, and the flow may entirely cease before the ovum is discharged. Then it is low down in the Fallopian tube or even in the uterus itself.

Now if coition takes place during the interval between two periods, or just before menstruation begins, the ovum being high up, only a few spermatozoa pass up the Fallopian tube and reach it; but if coition is just after menstruation, then the ovum is within the reach of many spermatozoa.

Stock breeders understand this. If they want a female they put the two sexes together at the beginning of the rutting period, but if a male is desired they wait until the female has been in heat some time.

During my term of service in the Boston Lying-In Hospital I had several opportunities of testing this rule, and have collected twenty three which bear it out.

I excluded those cases where there seemed to be any doubt at all in regard to the statements, and all married women, except three where the exact dates were given.

In twelve cases the data were obtained before delivery, and in all these the sex was predicted correctly.

In looking over the records of the hospital I found five cases which were noted as single connections, and the dates given. In all these the result conforms to the theory. In three instances the data were not

obtained until after delivery. Two of the cases were in the hospital when I came on duty, and the other was kindly furnished by Dr. W. L. Richardson from his private practice. The cases are as follows:—

I. A. S., twenty, single, primipara. Catamenia last seen June 18, 1877. Connection June 20, 1877. Delivered of a male child March 19, 1878. Data obtained after delivery.

II. A. McK., twenty, single, primipara. Catamenia seen the end of May, 1877. Connection a few days after the flow had ceased. Delivered of a male child February 28, 1878. Data obtained after delivery.

III. Dr. Richardson's case. A married woman, who desired not to have children, was told not to have connection until a week after the flow had ceased, nor within a week of the next period. She had connection the ninth day after she stopped menstruating, and became pregnant. She was delivered of a female child. Data obtained after delivery.

IV. S. S., twenty-six, single, primipara. Catamenia April 1, 1872. Single connection April 5, 1872. Delivered of a male child. Taken from the hospital records.

V. M. G., eighteen, single, primipara. Catamenia March 29, 1873. Single connection April 13, 1873. Delivered of a female child February 10, 1874. Taken from the hospital records.

VI. M. R., eighteen, single, primipara. Catamenia last seen July 16, 1873. Single connection two weeks before (July 4th). Delivered of a female child May 9, 1874. Taken from the hospital records.

VII. W. C., twenty-two, single, primipara. Catamenia January 11, 1874. Single connection just after. Delivered of a male child October 14, 1874. Taken from the hospital records.

VIII. S. Y., eighteen, single, primipara. Catamenia June 30, 1874. Single connection July 4, 1874. Delivered of a male child April 21, 1875. Taken from the hospital records.

IX. M. W., nineteen, single, primipara. Catamenia last seen during last week of May and first week of June, 1877. Had connection on two successive nights two weeks after the flow had ceased. Was delivered of a female child March 9, 1878. Sex was predicted.

X. M. H., twenty-three, single, primipara. Catamenia last seen June 24, 1877. June 29, 1877, had a single connection. Was delivered of a male child March 23, 1878. Sex was predicted.

XI. E. D., twenty-one, single, primipara. Catamenia last seen June 20, 1877. Single connection July 4, 1877. Delivered of a female child March 30, 1878. Sex was predicted.

XII. M. H., eighteen, single, primipara. Catamenia last seen June 18, 1877. Single connection a few days after flow ceased. Delivered of a male child March 23, 1878. Sex was predicted.

XIII. A. L., twenty-one, single, primipara. Catamenia last of July, 1877. Connection the day the flow stopped, and twice afterwards during the month. Was delivered of a male child April 1, 1878. Sex was predicted. The prediction was made in this case because symptoms of pregnancy appeared immediately after the first connection. This was a small child, probably born at the eighth month.

XIV. K. W., twenty-two, single, primipara. Catamenia stopped July 4, 1877. Single connection July 15, 1877. Delivered of a female child April 15, 1878. Sex was predicted.

XV. S. M., nineteen, single, primipara. Catamenia last seen during the first week of June, 1877. About the time of the next period, namely, July 4, 1877, had connection and "no show." Delivered of a female child April 3, 1878. Sex was predicted. Conception took place just before menstruation.

XVI. From Dr. Richardson's private practice. A married woman, who having had one child desired no more. She was very careful to have connection only just half way between two menstrual periods. She was delivered of a female child in May, 1878. Sex was predicted.

XVII. F. W., nineteen, single, primipara. Catamenia last seen August 1, 1877. Connection a few days after. Delivered of a male child May 3, 1878. Sex was predicted.

XVIII. H. D., twenty-one, single, primipara. Catamenia appeared July 25, 1877, and lasted one week. August 5, 1877, that is, four days after they ceased, had a single connection. Was delivered of a male child May 4, 1878. Sex was predicted.

XIX. C. L., thirty-two, married, third child. Catamenia last seen August 15, 1877. Her husband, "a traveler for a firm," came home August 26, 1877, and stayed until September 12, 1877. She has not seen him since. Was delivered of a female child May 18, 1878. Sex was predicted.

XX. A. B., twenty-four, single, second child. When fourteen years old she was seduced and had a child, since which time she has been insane. On the 17th of September, 1877, she came to Boston, from the Worcester Insane Asylum, with her mother to see the procession. She was lost in the crowd, and the next morning found in a house of ill-fame. She menstruated last from August 26 to September 1, 1877. Was delivered of a female child June 8, 1878. Sex was predicted.

I am aware that this theory conflicts with most, if not all, of the accepted theories on the subject of conception, and that the cases here presented are too few in number to establish any exact rule, but it certainly seems to me that the results obtained are extremely interesting and would warrant a further investigation of the subject.

RECENT PROGRESS IN THERAPEUTICS.¹

BY ROBERT AMORY, M. D.

Iron, Physiological Action, and Indications for the Use of Various Forms of; Contra-Indications, etc. — M. Cabrol² reviews his own experience with the use of iron, and advises under what circumstances the various preparations may be employed. Basing his physiological views on the theory that iron enters into the composition of the red blood corpuscles in the proportion of seven per cent., and that these latter are the most important organic constituents of the blood, he pleads for the necessity of the inorganic element (iron) as a nutritive agent. Whilst in health the amount of iron essential to haematosis is supplied by the ordinary alimentary substances; in feeble and convalescent patients who are also anaemic, ordinary food does not furnish the blood with the necessary amount of iron. He also mentions, what is no doubt true, that in modern medicine the old fashion of blood-letting has been replaced by tonics and stimulants.

M. Cabrol divides the preparations of iron into three classes: First, those which are pure metallic or in a state of oxidation. Second, those which combine with feeble acids to form salts. Third, those combined with strong acids. The third class are mostly used externally. Among those contained in the first class *le fer métallique porphyrisé*, in M. Cabrol's estimation, has the first place. He says it is well known that iron oxidizes very rapidly when exposed to the air, and owing to this many of the simple forms of pure iron cannot be readily used as medicines. The porphyridized metallic iron by the process of Coquet is, however, to all intents and purposes inalterable. This process is based on the preservative influence of cane sugar, and is very simply prepared by mixing the pure metal with cane sugar, and then drying. This form may be prescribed either in pill or powder, and in cases of fatigued stomach he administers with the iron a few teaspoonfuls of milk or alkaline pastilles. He writes enthusiastically of the beneficial and unexpected good effects of this iron in several cases of gouty and rheumatic affections, of nervous lesions, of advanced cachexia, etc., etc., and gives detailed reports of its use in cases of severe and obstinate chronic rheumatism, of general anasarca with albuminuria accompanied with marked systolic cardiac souffle, of lupus, and of pernicious anaemia with extreme prostration. All these were successfully treated with this iron preparation. Finally, he states that in passive venous engorgement and visceral plethora he prefers the pure metallic form of iron (neither salts nor oxides), whilst in nervous and debilitated patients the less irritating iron salts or the oxides.

¹ Concluded from page 372.

² L'Union médicale, February 26, 1878, page 292.

Dialyzed Iron Solution.—This substance has been extensively used as a medicinal agent, and yet there are many practitioners who are quite skeptical in regard to its utility as an iron tonic. It will probably take more time than has elapsed since its introduction to establish its value, and at present this report will merely give the method of its preparation and its strength, for which the reporter is indebted to Messrs. Wyeth & Co. for further information than that contained in his preceding report.¹ This solution contains ferric oxide, of which the proportion to the solvent varies according to the method of preparation. One sample of Wyeth's, taken at random in the drug market, furnished 24.49 grains to the ounce, and on further evaporation a dry residue yielding 2.81 grains of water, with very little hydrochloric acid, and 21.68 grains of ferric oxide. A second sample, of the same manufacture, furnished 24.30 grains of dry residue. A third sample, from another druggist, contained 18.63 grains, which on further evaporation yielded 3.07 grains of water, considerable hydrochloric acid, and 15.56 grains of ferric oxide. A fourth sample, of a different manufacture, yielded 17.88 grains of dry residue, but showed marks of imperfect dialysis, was quite acid to the taste, besides being much weaker in ferric oxide. A fifth sample, from still another manufacture, gave considerable hydrochloric acid, sal ammoniac, and only 6.85 grains of ferric oxide to the ounce of solvent. Further analysis in Wyeth's solution of dialyzed iron proved that the proportion therein of ferric chloride to ferric oxide was 1 to 27.8. These analyses were conducted by Professor Genth, of the University of Pennsylvania. From this a fair conclusion may be drawn that the results of administration of the ferric chloride and ferric oxide contained in the commercial solutions of dialyzed iron would be influenced by the size of the dose and the purity of the preparation. Being a weak preparation of iron it should be prescribed in doses sufficiently large to produce the decided effect of iron. The estimation by specific gravity might give some idea of the amount of solid iron contained in the solution. Wyeth's method of preparation gives a specific gravity of 1.400. He uses a high temperature to facilitate dialysis, which may take four or twenty days. He also uses water, either distilled or drawn from an artesian well, and parchment paper. The final results of dialysis are determined first by taste, and then by assay by the following test: "Precipitating with a solution of ammonia previously heated; washing and igniting to get the amount of peroxide of iron; washing to expel excessive ammonia, and then adding solution of nitrate of silver; washing, igniting, and heating to obtain amount of chlorine."

Dr. Fothergill² advises against the use of iron when rapidity of pulse rate is combined with an elevated temperature, and gives as indications

¹ Vide JOURNAL, September 27, 1877, page 362.

² Practitioner for September, 1877.

for its use normal temperature, cool skin, pale face, and clean tongue in debility arising from anaemia. In the former case vegetable tonics, as quinine or strychnine, together with mineral acids, should be given instead, and then the iron, in small doses at first, after eating. In phthisis especially it should be withheld when the above contra-indications are present. He prefers the lighter preparations, the ammonio-citrate, tartrate, or the citrate of iron and quinine. When the iron treatment is found too "heating" he adds a small quantity of sulphate of magnesia. So, again, in certain acid conditions of the blood in atonic gout or in chronic renal disease, bicarbonate of potassa, potassium-tartrate of soda, with a little *nux vomica* in infusion of buchu combined with a liberal draught of water, are preferable. With old persons iron rarely agrees, but for the young it is especially beneficial. In so-called biliousness and a loaded portal circulation iron will disagree unless this over-loading be relieved by salines and strychnia with nitro-muriatic acid. At the catamenial periods, when menorrhagia is associated with pallor and debility, an attempt should be made to lessen the loss rather than to stimulate blood formation. During the interval a little sulphate of magnesia with dilute sulphuric acid in some vegetable astringent infusion should be given, along with a restricted dietary; and in those cases where it is necessary to encourage blood formation during the interval the chalybeate treatment should be suspended before the menstrual molimen, and in its stead the mixture above mentioned should be given.

In opposition to the opinion of Drs. Brown-Séquard, Hughlings Jackson, and Fothergill, Dr. Gowers¹ summarizes the action of iron on epileptics:—

"(1.) In a certain proportion of cases of epilepsy, probably a minority of the whole group, iron does increase the frequency and severity of the fits.

"(2.) In a large number of cases iron may be given without any recognizable influence on the attacks.

"(3.) In many of the cases in which its effect is injurious the increase in fits does not occur until after the iron has been taken for some weeks, and in some of these cases the first effect of the drug is to cause a diminution in the frequency and severity of the attacks.

"(4.) In some cases this beneficial effect, instead of being transient, is permanent, and great benefit results from the continued administration of iron; so that by its use alone some cases may be cured, as far as the affection can be said ever to be cured by drugs."

Dr. Gowers presents cases which seem to prove that iron produces a beneficial action in certain cases, and not in others. He suggests the conclusion that iron does not have a haematinic effect in epilepsy, but exerts its influence on the nervous system much in the same way as

¹ *Idem, October, 1877.*

zinc, silver, and some other metals. The only occasions for a chalyb-eate treatment in epilepsy he thinks are in those forms which seem to be midway between hysteria and epilepsy, though it is also useful in certain cases of a more purely epileptic type.

M. Hayem¹ has found from a large number of examinations that a cubic millimetre of blood drawn from the finger of a healthy person contains five million five hundred thousand red corpuscles; in that from persons poisoned by lead, and who are anaemic, the absolute number is about the same,—five million three hundred and fifty-two thousand, for instance,—though their size is altered, and they contain only half the normal amount of haemoglobin. Under appropriate iron treatment, though the number of red corpuscles remained unchanged, sometimes even diminishing, their size and color became normal, though it was necessary to continue the treatment for a considerable period of time.

*Coca or Cuca.*²—In a leading article appears a review of the practical applications of this drug in fatigue proceeding either from physical or mental over-exertion. The writer bases his deduction on Sir Robert Christison's experiment, on similar experiments by Von Tschudi and others, and on observations in South America by Mantegazza; he does not attach much importance to earlier and somewhat exaggerated accounts of Europeans who have visited South America, and who have picked up their information from the natives, without making any original investigation. These deductions may be concisely stated: (1.) Coca is a stimulant without increasing the pulse rate or body heat; on the contrary, the pulse rate usually falls, even after muscular fatigue,—in Sir Robert Christison's experience from 90 to 72 beats after two hours. (2.) Coca suspends hunger and thirst. (3.) Coca in moderate quantities is not followed by injurious or unpleasant after-effects. (4.) The best effects are obtained by chewing the dried leaves (if properly cured) mixed with lime, though there is no reason to suspect that a carefully prepared infusion or vinous preparation does not contain the active principle, which our writer supposes to reside in a peculiar form of tannin,—perhaps also in an aromatic and volatile substance. (5.) In various forms of dyspepsia, colic, diarrhoea, and general debility it has long been a favorite among the Indians, and Mantegazza reports his own experience of its value in most of these affections. Drs. Colin, Fauvel, Gazeau, Rabuteau, and Cintrat bear witness to the value of this medicinal agent, especially in the form of *vin de coca Mariani*, in tonsillitis, albuminuria, and diabetes. Dr. Fauvel especially speaks of its beneficial effect in a peculiar form of rebellious granular pharyngitis, which resisted all other kinds of treatment. He also says, "Le coca est le tenseur par excellence des cordes vocales."

¹ Practitioner, July, 1877, and Comptes rendus, Tome lxxxiii., page 985.

² Medical Examiner, December 13, 1877.

Concerning the Effects of Arrest of Circulation and Action of Potash Salts on the Animal Body. — Drs. Ringer and Murell have made some interesting experiments¹ which bear very closely upon our knowledge of the therapeutical action of sedatives. These experiments seem to show that arrest of circulation affects sensation, reflex action, and voluntary motion very rapidly, and in the order above named; moreover, that this effect is more rapidly produced in the month of September than in June. Yet this may be explained by the fact that frogs were used in these experiments, and that their vital functions are more depressed in the month of September than in June. However this may be, the general results obtained show most conclusively that arrest of circulation, whether it be accomplished by ligature or bleeding of vessels, or by abolition of the central propelling organ, the heart, does most seriously interfere with the animal functions. Our authors explain the paralysis by the hypothesis that the tissues are deprived of oxygen, and that the materials of destructive metamorphosis accumulate. Oertmann's authority is cited to prove that the "salt" or "bloodless frog" maintains its vital functions by means of the oxygen conveyed by the salt to the tissues. The action of chloride of potassium and of other potash salts may be explained, according to Dr. Ringer's opinion, as due to stoppage of the heart's action by direct poisoning of muscular tissue, and by poisoning the nervous centres and the nervous system. This he confirms by experiments which prove that paralysis ensues more rapidly after poisoning with the potash salt than after the arrest of the circulation. He moreover thinks it probable that chloride of potassium "acts on the nitrogenous tissues, altering their chemical nature, and so destroying or arresting their function." He summarizes the action of this drug as follows: "(1.) It paralyzes all nitrogenous tissues. (2.) It acts by an equal affinity for all protoplasm, and it destroys the tissues in the order of their vital endowments. (3.) It arrests the heart, owing to its common action on all protoplasm, not from a special action on that organ. (4.) Arrest of the circulation itself, a paralyzing influence, must in some degree assist the direct action of the potash on the tissues. (5.) By arresting the circulation, potash, probably at an early stage, depresses the reflex function of the cord, in the summer months, indirectly through arrest of the circulation in the brain."

Dr. Ringer explains the slow action of potash by the hypothesis that being a powerful poison, both of muscle and nerve tissue, when absorbed it paralyzes the heart, and thus the passage through the circulation is impeded; then its slow diffusion through the tissues very tardily poisons them.

Doubtless the application of this theory of the action of drugs upon the circulating forces must inevitably interfere with the explanation of

¹ *Journal of Physiology*, March 12, 1878, page 72.

the specific action of sedative agents, from the very fact that mechanical obstruction of the circulation of blood produces in a great measure the effects which are similar to many of the so-called sedative agents. For instance, the primary action of atropine upon the capillary circulation contracts the lumen of the capillaries, and the primary action of aconite enlarges the lumen of the capillaries. The action of digitalis increases the tone of the circulation of blood. Something might be also said of the action of opium on the vaso-motor system. These factors may have much to do with the antagonistic action of many of our remedies. So also may we call attention to the effects of diseases upon the mechanical forces of the circulatory functions. In this way many of the therapeutical effects of drugs may modify pathological conditions, and thus our means of combating disease may be greatly strengthened.

A knowledge of the action of ferruginous agents upon these pathological changes may assist the practitioner in determining the indications for therapeutical measures.

PROCEEDINGS OF THE BOSTON SOCIETY FOR MEDICAL IMPROVEMENT.

E. G. CUTLER, M. D., SECRETARY.

APRIL 8, 1878. *Chronic Ulcer of the Duodenum.*—The following account of the case of the late Dr. H. C. Bickford, of Woburn, and formerly of Charlestown, was furnished by Dr. R. A. BLOOD, the attending physician:—

"Dr. Bickford had vomiting of blood for the first time some twenty years before his death. Previously to this he had had good health. The attacks of haemorrhage continued through life at intervals of two and three years, there being never more than three years between them. Generally very large quantities of blood were lost, causing great prostration. Up to the last two years of his life the attacks came on during warm weather, but the last two occurred in winter.

"He always attributed an attack of bleeding to something eaten, some indigestible food, but I had noticed that the bleeding would come on after a hard day's work, and on several occasions after a difficult case of instrumental labor. After one of these bleeding spells he would become pulseless; in fact, he would be in almost a state of collapse. I saw him in one of these severe attacks when he came near dying, there being no pulse at the wrist for twelve hours. The distress from loss of such large quantities of blood was frightful; he expressed it as being indescribable. At this particular time he got relief from the use of large doses of opium in the form of McMunn's elixir, drachm doses being given by injection into the bowel.

"Vomiting was not always present, never being a prominent symptom until during his last sickness. The blood was passed mostly from the rectum, the stools looking not unlike tar. Pain was almost always present, more fre-

quently in the stomach than elsewhere, sometimes running through to the back. It was more severe after than before haemorrhage; in fact, pain was the chief symptom, coming on more severely about three hours after food was taken. This led him to think the ulcer was below the stomach, probably in the duodenum, where it proved to be situated.

"Bread and milk constituted his principal diet for some years, and this while he was doing a very large practice; but for years before death all kinds of food were taken, and generally well digested, he being much better nourished than when milk was the exclusive diet. At first almost every medicine given in such cases was tried, but with very little benefit, opium being an exception. The mode of treatment adopted during the last years of his life proved the best, giving more relief and recovery taking place more quickly than by any other. It consisted in sulphate of morphia to relieve pain, given hypodermically in doses of one eighth to one quarter of a grain, every four, six, or eight hours, and beef tea and gruel injections given every three or four hours, and constituting all the nourishment taken. Sometimes, when haemorrhage was present, fluid extract of ergot in twenty to thirty drop doses was added to the beef tea. Also at times the tincture of the chloride of iron was given in the same way, but with how much benefit I cannot say. At times while he was under this treatment, taking no food by the mouth, a teaspoonful of milk would be given, and this being well borne, the quantity would be increased, and in this careful way he would get to eating again. At one time when he had been sick for six weeks, taking no food by the mouth, I suggested sweet buttermilk in small quantities. There was not the slightest distress following its use, and he continued it, gaining very rapidly, and this time making a quick recovery.

"Dr. Bickford's last sickness was a very distressing one. The vomiting was most persistent, large quantities of blood were lost, and the pain was very acute. Morphia had to be given in large and frequent doses. Hiccough was present four days and nights. This was relieved, after almost everything else had been tried, by chloral hydrate given by injection in doses of fifteen grains. The distress at this time was very great, owing apparently to the loss of blood, and morphia did not seem to control it. The immediate cause of death was haemorrhage. He became pulseless more than forty-eight hours before death, but still seemed conscious of everything around him most of the time.

"Dr. Bickford was always very careful about his mode of eating and drinking, never using anything that he thought might not agree with him, and this extreme cautiousness probably prolonged his life to an unusual extent."

Dr. Frrz showed the specimen, and said that the ulcer, about an inch in diameter, extended through the posterior wall of the duodenum, its base being formed by the smoothly eroded head of the pancreas. A considerable depression in the latter was observed, filled with a moderately softened and superficially decolorized clot. When this was removed several fibrous granules projected from the floor of the ulcer, apparently branches of the pancreatic artery, a large branch of which ran beneath the ulcer without opening upon it. No large arterial branches were found in the eroded wall of the duodenum. There were dense and firm adhesions between the intestine and the pancreas.

The small intestine contained liquid blood intimately mixed with its contents. The stomach presented merely moderate thickening and pigmentation from chronic catarrhal gastritis, there being no cicatrices indicative of previous ulceration. The case was interesting from the long duration of the disease, as evident from the clinical history of the case and the absence of anatomical signs of exacerbations or remissions.

Ovariectomy. — DR. J. HOMANS reported two cases of successful ovariectomy, which will be published in detail.

DR. PUTNAM asked if the cases where the tumor was adherent to the peritoneum and neighboring organs did better after operation than others in which it was not. He had seen many reports of cases which had led him to believe that this might be a fact.

DR. HOMANS answered that when the patient was run down by the disease the case was apt to do better after operation. Of the two cases he had reported the first was a patient who was well and able to be about; the second was sick in bed. In Mr. Keith's last series of fifty cases only four deaths had occurred.

DR. BIGELOW considered that a mass of catgut wound round the ligature and pedicle and left in the bottom of the pelvis would help give good results by furnishing a certain amount of antiseptic material there till the normal condition of the pedicle returned.

DR. HOMANS said that Schroeder uses no catgut. The reason he uses catgut himself and drops the pedicle back is that in his last clamp case death resulted from pyæmia consequent on sloughing of the pedicle beyond the clamp towards the pelvis.

Case of Supposed Congestion and subsequent Transient Inflammation of a Segment of the Spinal Cord. — On the 2d of December DR. ABBOT was called to a widow lady eighty-six years of age, who up to that time had had almost uninterrupted good health. She was a person of very active habits, walking considerable distances without fatigue, and her mental powers had retained the acuteness and vigor of youth. The only exception to her uniform health had been occasional attacks of severe nocturnal cramps in her lower extremities, to which she had been subject for some years. These awoke her from sleep, and compelled her to spring from her bed for the relief which possible extension afforded. Trusting to her powers of digestion she had eaten a six o'clock dinner the evening before of roast turkey and mince pie, the latter having been taken also on the two evenings previous. She was aroused at an early hour on the 2d by a sense of oppression at the epigastrium, which was somewhat relieved by a carminative. Falling asleep, she was awaked about an hour after by what she considered "one of her cramps" in both lower extremities, and sprang out of bed, hoping for the usual relief. The pain was very severe, and she fell on the floor, from which she found herself unable to rise. The first severe pain passed off, but left behind it such extreme soreness that she was completely helpless. In this condition she remained until discovered by a member of the family an hour after. When first seen by Dr Abbot, several hours later, the patient was in bed, quite free from cerebral symptoms, able to draw up and extend her limbs with perfect ease, and com-

plaining only of excessive soreness of her legs, the most moderate, even a light touch on either leg causing much pain. There was no other complaint; sensibility seemed to be perfect. The impression produced by the first aspect of the case was that the condition was the effect of a very severe cramp of the muscles of the legs, probably reflex in character and the result of indigestion. The patient's condition remained the same for about twenty-four hours; at this time there occurred an occasional involuntary escape of urine, although in general the discharge could be controlled. The cutaneous hyperesthesia continued, and was the principal subject of complaint. On the fourth day she began to speak of her back, saying that the slightest motion caused her pain; the over-sensibility of the skin continued. On examining the back there was found extreme sensitiveness to pressure over the lowest lumbar vertebra and the whole length of the sacrum. The slightest attempt to change her position or to turn over in bed caused an outcry of pain. There was at this time very little incontinence of urine. The left leg seemed a little weaker than the right, and could not be so easily drawn up. Cutaneous hyperesthesia less marked. The symptoms gradually subsided, and by the eleventh day the dorsal pain and the morbid sensibility of the skin had disappeared, and the patient could stand with support, the left leg being much more feeble than the right. The improvement steadily continued, until at the end of the third week she could walk about without support, limping somewhat on the left leg.

Very little drug treatment was employed in this case, the patient being averse to the use of medicine, and the indications not being urgent. Two or three small doses of ergot were given on the first day, but it was so distasteful to the patient that its use was abandoned. An india-rubber bag filled with hot water gave great relief to the pain in the sacrum, and mild sedatives were used to insure sleep. No fever was observed during the attack, and the constitution was but little depressed by it.

Interesting features in this case are the suddenness of the attack, and its probable origin in a reflex irritation of a part of the spinal cord, arising from indigestion, leading probably to congestion followed by effusion, with the symptoms due to pressure and subsequent local inflammation, and the rapid recovery of a person of such advanced age.

Dr. Abbot remarked that the case would seem to throw some light on the question of the origin and possible effect of cramp of the lower extremities which so commonly occurs at night, and which is relieved by the change from a prone to an erect position and by straightening the limbs. In this connection he referred to the case of a lady who for many years has been unable to sleep in her bed on account of nocturnal cramps, but passes her nights in a semi-recumbent position on a couch, with her feet most of the time on the floor. There would seem to be a condition of the circulation in the spinal cord while the body is in the horizontal position favorable to the occurrence of the phenomena in question.

Dr. WEBBER, in commenting on the case, said he had never seen one exactly similar. Most cases come on insidiously; if it were congestion alone the symptoms would have passed off more rapidly. He thought the case more consonant with inflammation.

DR. ABBOT remarked that the case accorded with cases described by Hammond as congestion of the spinal cord. He thought that inflammation of one week duration was a rapid course for the same.

DR. WEBBER further said that the line between congestion and inflammation is hard to draw. Light cases do not come to autopsy. A congestion could not continue long without increase of nuclei and inflammatory changes.

Anesthesia caused by Injection into the Rectum of a Solution of Carbolic Acid. — DR. C. P. PUTNAM reported the case. A boy four years old had four or five discharges daily from the bowels containing blood, and it was proposed to wash out the colon with water containing carbolic acid. Two teaspoonfuls of the liquid crystals of carbolic acid were put in two pints of water, and three quarters of this whole mixture were slowly injected into the rectum without giving rise to any pain; this amount was considered enough; the nozzle of the syringe was removed, and the patient said something "became numb and commenced to jerk." The respiration was 30 in the minute, and superficial; the pulse 168 at first, but in the course of the next two hours it fell to 120. Brandy was injected subcutaneously, and the bowel washed out with water continuously till the water returned free from odor. At the end of two hours the patient showed some signs of consciousness and said a few words; he then slept two hours longer, apparently naturally, and next day was as well as ever. He was perfectly anaesthetized, for the subcutaneous injections gave rise to no muscular reaction. Dr. Putnam had tried the same method before in a weaker solution without much effect. On a previous occasion he had used a creosote injection in a child, and during it the child had fallen asleep. In this case it was a question whether the anesthesia was the result of the local effect of the carbolic acid, or whether it was the result of absorption. The anesthesia had been observed in a very short time indeed.

DR. WARREN spoke of a case of poisoning by carbolic acid in which the liquid crystals had been drunk; instantly the person fell down, and death followed shortly after. He asked about the character of the urine in Dr. Putnam's case.

DR. PUTNAM answered that the urine was said to have been dusky after recovery in his case at first; when seen by him the next day the urine was not dark nor was there any unusual odor about it. The heart was not paralyzed, as in cases of fatal poisoning reported, but, on the contrary, it seemed to be stimulated. There was no cyanosis. There was no symptom which might not have occurred in ether anesthesia.

APRIL 22d. *Chronic Ulcer of the Duodenum. Congenital Absence of Left Kidney and Ureter.* — DR. G. J. ARNOLD, present by invitation, reported the following case: R. G., a house painter, fifty years of age, married, had had one attack of painter's colic some five years before. For the past six or eight years had suffered occasional attacks of a similar character to that for which he entered the hospital recently. Two months before his entrance he had been suddenly attacked with distress in the epigastrum in the night from no known cause, and on getting out of bed became dizzy, and fainted. On the next night he had cramps in his limbs, accompanied by general numbness and

a distortion of the mouth, which symptoms lasted half an hour. The "cramps" have recurred several times since, unaccompanied by the other symptoms. From the commencement of the attack to his entrance into the hospital, some two months, he had suffered from nausea and vomiting daily. His breakfast was usually retained without pain, but by three o'clock in the afternoon (dinner at twelve to one) he had distress in the epigastrium, sometimes extending to the left but never to the right hypochondrium; at the same time he had eructations of wind and flatulency, and his bowels would "knot up." These symptoms had usually continued till midnight, or he had vomited three or four times. If nothing at all was eaten he vomited large quantities of a whitish, foamy, sour liquid. He never had had hæmatemesis. All his food distressed him. The bowels were constipated. Enemata brought away light-colored stools. Micturition normal. Had lost flesh and strength. In general appearance the patient was thin, pallid, and languid.

He was ordered to keep in bed, and to have a pure milk and lime-water diet; warm water enemata daily if needed. Morphia was given as occasion demanded, and iodide of potassium three times a day in two-grain doses; also quinine and strychnia in small doses. The pain diminished for a few days; the quinine and strychnia were omitted, and the iodide increased to ten grains three times a day. For a week there was no nausea or vomiting, and the patient was then allowed toast, milk, and mush. A week later pain had returned, and was of a grinding character. The iodide was omitted. Vomiting recurred, and the skin was noticed to be of a straw color. The next day in the evening he vomited over two quarts of a brownish homogeneous fluid, which contained blood corpuscles, fat globules, starch granules, and sarcinae ventriculi. It was then learned that the patient had vomited a like quantity of a similar fluid a few nights before. He had also vomited the same a year before, and again six months before. The stools which followed the enema were on this day dark brownish. Patient complained of a dull ache low in the epigastrium. On deep pressure over the region of the pyloric orifice there was found to be a tender spot about the size of a robin's egg. There was also tenderness along the greater curvature of the stomach. The skin was noticed to be more yellow. Vomiting was preceded or accompanied by slight convulsions of the limbs and face.

The next day in the evening he vomited about one quart of fluid quite similar to that before spoken of. The patient was much exhausted, and complained of difficulty of micturition. The next twenty-four hours he progressively failed and about midday had tonic convulsions of the whole body. At this time there was almost complete absence of the cardiac second sound. Vomiting and complete relaxation soon followed the above condition. After lingering till late in the afternoon in a semi-comatose condition he died.

Dr. E. G. CUTLER showed the specimens. The ulcer was on the posterior wall of the duodenum, just outside the pyloric end of the stomach, and was about as large as the ball of the thumb; it extended nearly through the muscular coat of the duodenum, and behind it was a portion of the head of the pancreas. An eroded vessel, evidently an artery, opened into one end of the ulcer, and a small clot protruded from its extremity; on dissection it proved

to be a branch of the pancreatico-duodenalis. The stomach was dilated, its muscular coat hypertrophied, and its mucous coat thickened, and in a state of chronic catarrh. It was filled with a quart or more of coffee-colored fluid, which same was also found in the upper part of the small intestine. The left kidney and left ureter were wholly absent. The left spermatic vein ended at right angles in a vein which came from the left supra-renal body and passed directly into the ascending vena cava. These two veins were of the same size as the right spermatic and right renal veins. There were two small arteries, a little larger than knitting-needles, which supplied the left supra-renal body, which latter was of normal size and appearance. The left renal artery was wholly wanting, and there was no artery which might answer to it. The bladder did not present the usual trigone, the muscular band on the left and the opening of a ureter being absent, and no dimple or depression present suggestive of an attempt at a ureter. There was nothing unusual about the right kidney or its blood-vessels, except the size of the organ, which was not above the normal. Its weight was about six ounces, and nine papillæ were counted, one being a double one.

DR. BAKER had seen a case where there had been malposition of the ureter opening, which was so located that the secretion from the corresponding kidney could be collected. From the small quantity of urine secreted he had been led to diagnosticate atrophied or congenitally small kidney on that side.

Diphtheria. — DR. HALL CURTIS read a paper on some cases of diphtheria, which will be published in detail.

DR. BOWDITCH asked if any evil effects had followed the use of salicylic acid in these cases. Death had been reported after its use.

DR. CURTIS answered that he had seen only head troubles of little account, and an erythema becoming a papular and subsequently a pustular eruption.

DR. WHITTIER had seen some persons in advanced years who were subsequently affected with depression, and a condition which was evidently not due to the rheumatism for which salicylic acid had been given; having in mind these cases he would give it cautiously in aged people.

MAY 13th. *Surgical Dressings with a View to their Preservative Properties.* — DR. BRADFORD showed some specimens of meat done up in different dressings, and said that it was admitted that the main principle in surgical dressings consisted in the prevention of putrefaction of the discharges and dead organic matter about the wound. There had been a number of experiments as to the relative value of different antiseptics, but few, if any, as to the protective power of different dressings.

A piece of meat dissected from a freshly killed kitten and put in a bottle which had been rinsed out with carbolic acid (1 to 20) putrefied in three days. This was the case in a bottle corked and in one left open. A piece of fresh meat placed uncovered on a table at the side of the bottles dried up, and eleven days later gave no odor. A piece of flesh wrapped in a water dressing became foul in three days. Flesh dissected out under spray and placed in a Lister dressing (antiseptic gauze) at the end of three weeks was found perfectly fresh, not being at all dried. Flesh wrapped up in lint wet with tere-

bene at the end of three weeks was fresh and not dried. The same wrapped in lint wet with compound tincture of benzoin remained sweet, but dried. La-barraque's solution (1 to 10) poured on a cloth and wrapped about the meat delayed putrefaction, but did not entirely prevent it. At the end of three weeks the meat was foul, but not as putrid as that in the water dressing. The same can be said of a solution of sulphite of soda 1 to 10. A mold was found on this dressing, which on examination was seen to be *penicillium glaucum*. Meat wrapped up in dry cotton cloth, Dennison's absorbent cotton, oakum, salicylicized tow, or lint soaked in benzoic acid became desiccated. Meat not dipped in carbolic acid and covered with gold-beater's skin to prevent desiccation was not protected, when wrapped in cotton, from becoming at the end of three weeks slightly putrid. A piece of meat, however, placed in a glass tube, the end of which was stopped by cotton, without any treatment by carbolic acid, dried and remained free from putridity. The cotton in this case did not act by absorbing the fluid and desiccating, as it was so placed as not to touch the meat. Meat completely covered over by vaseline remained fresh. Pieces covered by fuller's earth and charcoal became dry, and remained free from odor. The piece of flesh which at the end of three weeks was the freshest, being as soft as when first dissected off, and entirely free from odor, was that wrapped in the antiseptic gauze. The next in excellence of preservation was that in lint wet with terebene. It has been stated that Lister's success is perhaps not due to any antiseptic (in the strict sense of the word) action of the dressing, but to the cleanliness his method enforces.¹ As far as experiments on dead flesh can bear testimony, it seems evident that there is a strictly antiseptic action in Lister's gauze dressing.

DR. GREENOUGH thought there was a difference between keeping dead tissue and the preservation of living tissues in a wound, and hence the experiments of Dr. Bradford did not show much.

DR. BRADFORD answered that there was necessarily dead tissue in every wound, and the idea of all dressings was to keep this dead organic matter from decomposition, and that which did this the best was therefore the best dressing.

DR. HODGES, speaking of Lister's method, said that there were several elements which entered into the success of the treatment. Drainage is one of the chief features, and doubtless has a great influence in making the treatment successful. Compression, from the large amount of material used, is another; the absence of the usual disturbance in the infrequent removal of dressings another; so that to estimate the individual value of these different elements is difficult.

DR. ELLIS spoke of the efficacy of rest and compression in the treatment of chronic ulcers of the lower extremity.

DR. LANGMAID had discarded the water dressing some time ago, and made large use of the compound tincture of benzoin, which had the additional advantage of rendering the bandages stiff and immovable, and thus insuring perfect rest. He regarded this as a better dressing for injuries of the fingers than carbolic oil, which he had also tried largely.

¹ JOURNAL, May 2, 1878, page 571.

Nitrite of Amyl as a Nervous Sedative. — DR. LYMAN referred to the efficacy of nitrite of amyl in a case of the opium habit, where after two or three nights of complete wakefulness, consequent on breaking off the habit, a nervous irritation had ensued, most distressing to the patient and the friends. He had caused the patient to inhale the nitrite directly from the vial; two or three whiffs had been sufficient to bring on the therapeutical effects, which were followed by refreshing sleep. The flushing of the face had been the criterion for ceasing the use of the drug in this case.

INSANITY AND ITS PREVENTION.¹

It has been alleged that our asylum superintendents have devoted themselves to the treatment of insanity to the neglect of efforts for its prevention. This allegation is partly true from the nature of the case, but has been made too sweeping in its application. Year after year, in their recognized channels of communication with the public,—their annual reports and the journal of their association,—they have sent out suggestions which, taken together, leave but little new to be said on the subject. Moreover, from time to time, specialists have published books or magazine articles containing much valuable information bearing directly and indirectly on the prophylaxis in mental disease. There has been no lack of warning or instruction in this country, however it may have been in England, and yet by reason of a general neglect to profit by it, each new effort in this direction should be heartily welcomed.

Perhaps sociologists, moralists, and public educators have been waiting for some elaborate system, or expecting a startling discovery, and have underrated the importance of the few simple and often self-evident directions which for years have been within easy reach. No doubt some platform sensationalist might put these maxims of common sense into axiomatic form, and with a prelude on some wholly irrelevant subject get the public ear. At any rate those who read Dr. Tuke's very instructive little book will find a new name for an old thing, and in the term *autoprophylaxis* may discover a potent charm such as they have hitherto failed to find.

In Parts I. and II. the author endeavors to infer the probable comparative amount of insanity in ancient and modern times from the relative prevalence of its chief causes. Those used in this test are intemperance, poverty, and moral and intellectual causes. In Part III. he treats of the self-prevention of insanity.

The control or removal of these causes as they affect the community is the province of social science, and implies the use of almost superhuman powers. To the individual the task is easier, at least in respect to the first two, since intemperance and sexual excess may usually be avoided, and in our country, at least, poor nutrition is oftener the result of not knowing *what* to eat than of an inability to get *enough* to eat. The avoidance of psychical causes is a more difficult matter. The practice of all the moral virtues is to be assumed, and something more in the way of educated self-control and moderation. At the

¹ *Insanity in Ancient and Modern Life, with Chapters on its Prevention.* By DANIEL HACK TUKE, M. D. London: Macmillan & Co. 1878. 8vo. Pp. 255.

best, each one is necessarily exposed to the vicissitudes of life, and to great emotional crises which tend to destroy the balance of even a healthy mind. False methods of education have usually wrought their mischief before the student has arrived at an age to profit by Dr. Tuke's note of warning. This warning has been many times "repeated, and is of late having some effect, at least in Boston, where the faults of our system of education are freely discussed. Dr. Tuke refers to the writings of Drs. Ray, Earle, Cook, and Smith, as well as other American alienists, in his remarks on "young America," a term less familiar to our ears now than formerly.

The insane temperament is not difficult of recognition, at least by physicians. Persons with a more or less insane ancestry may expect to have it, as well as others who inherit a susceptible brain by reason of intemperate, consumptive, or neurotic parents. It occurs in several forms, of which Dr. Tuke mentions the weak-minded, the melancholic, the nervous, the excitable, and the depraved. Those who are conscious of the above predispositions, and also all persons who have been violating the laws of mental hygiene, should take warning by the following signs, namely, inability to sleep, dull headaches, inaptitude for the duties of life, unwonted irritability, moroseness, suspiciousness, fear of the future, indecision, want of reality in the appearance of things, in fact, by any change in the kind or degree of their mental operations. Undue exhilaration, alternating perhaps with despondency, is as suspicious a symptom as those of a more distressing nature.

In averting a threatened attack of mental disease, the importance of "cheerfulness, rest, and a moderate diet" is inculcated. This advice is certainly of very respectable antiquity, emanating from the school of Salerno, founded by Charlemagne, and Dr. Tuke's enlargement of this theme is especially instructive. Of all things, *excess* is to be shunned. Extremes are always hurtful. Asceticism and dissipation may lead to the same goal. Life at high pressure is sure to end in mental bankruptcy. An aimless existence is equally disastrous.

In regard to diet, beer and light wines in moderation are commended as useful to some and harmless to most. Beyond a very moderate use, no agent is more directly influential in producing insanity than alcohol. Coffee is regarded as a useful stimulant, and tea as very nutritious from the large quantity of fat and albuminoid substances it contains. The brain requires a due supply of nitrogen, potash, soda, phosphorus, and sulphur. Excess of starch and fat delays the change of nitrogenous tissue. The following calculation is given (authority not stated) of the ratio in force-producing value of the following articles of diet: One ounce of oatmeal, when oxidized in the body, will give rise to energy or heat sufficient to raise one hundred and fifty-two tons one foot high; one ounce of sugar, one hundred and twenty-nine tons; one ounce of bread, eighty-three tons; one ounce of meat, fifty-five tons; one ounce of potatoes, thirty-eight tons.

Besides much information of vital importance to every person predisposed to insanity, the book contains valuable statistics in relation to the increase of insanity in England. We earnestly recommend it to the public and the profession. Let no one complain of a lack of advice until its maxims are put in practice.

T. W. F.

THE PRELIMINARY COURSE OF THE JOHNS HOPKINS UNIVERSITY.

WE give elsewhere the announcement of the course of study which it has been decided to adopt for those students who are to prepare themselves for the study of medicine. The course is of three years' duration, and will consist in the first year of chemistry, mechanics, physics, and modern languages, and in the last two mainly of anatomy and physiology; at the end of this course the graduates will be prepared to enter the medical school, the plan of instruction in which, so far as we know, has not yet been decided upon. For this preliminary work it is proposed, although not yet definitely decided, to grant the degree of Bachelor of Medicine. It will be seen that the arrangement differs materially from that offered by Dr. Billings, in the series of lectures to which we recently called attention. The object of this plan, as now arranged, is evidently the giving instruction in those subjects only which have a direct bearing upon the student's future studies and pursuits, it not having been thought necessary to give the future student of medicine the benefit of a liberal education, such as could be obtained in the academic course, and in accordance with the suggestions contained in the lectures alluded to.

We confess to a feeling of disappointment on reading this plan of the trustees. It seems almost equivalent to the announcement that an A. B. degree is not desirable for the education of a physician, and although with certain additional examinations this degree may be obtained, it can hardly be considered as ranking with those of our best universities, and must inevitably lower the value of the Johns Hopkins academic diploma rather than gain itself by the association.

It has all the flavor of a high-school rather than a university course of study. The standard for admission to this department is lower than that to the academic course, and the character of the studies must inevitably be narrowing in its tendency, confined as they are to the requirements of a single profession.

Coming at a moment when it is hoped that a better educated class of men will study medicine, as has been shown already in those schools which have raised their standard, where university graduates are rapidly on the increase, it cannot be regarded other than a misfortune that so prominent a school, and one from which it has been hoped in every quarter that an altogether higher education was to be offered, should present such a substitute for a liberal education.

In the next place, it is possible that such a course as this will attract a class of students who may be inclined to take unfair advantage of it, and that Johns Hopkins University will be obliged to father a certain number of bachelors of medicine, in full practice of their profession, who have availed themselves of their three years' proximity to a hospital to get a smattering of the practical work. There are many minor criticisms to be made, such as the omission of botany and geology from such a course; the presence of psychology, which ought to be studied only by the advanced medical student, and the invasion which it makes upon the regular course of medical instruction, to

say nothing of the inappropriateness of the title,—faults which are almost the inevitable consequence of an attempt to construct a hybrid department. The university diploma is the lowest standard which such a school can afford to adopt, if it is to take the high rank that medical teachers throughout the country hope and look for. In addition to its own diploma those of certain other of our best universities might be accepted, or the student be subjected to a preliminary examination which would in all respects be the equivalent.

MEDICAL NOTES.

— Up to the beginning of this week the epidemic of yellow fever has abated but slightly, although the progress towards improvement in its character was steady during the last two weeks. The deaths for the week in New Orleans were fewer by nearly one hundred than in the previous week. The daily decrease in number is not striking, however. The total number of deaths in New Orleans, up to Sunday, was 2470. According to the papers, Surgeon-General Woodworth has received from a lady \$250, given on condition that a sufficient amount be contributed to pay the expenses of a commission of experts, to be selected after consultation with the leading members of the American Public Health Association, to investigate the yellow-fever epidemic, the nature and cause of the disease, its treatment, especially its prevention; and the National Relief Association have adopted a resolution, calling upon the chambers of commerce of New York, Philadelphia, Boston, Baltimore, St. Louis, Chicago, and Cincinnati, asking each if they will contribute, and how much, to aid the necessary investigation. If the responses are favorable, the National Relief Commission pledges its material coöperation. The expenses of such a commission would be about \$6000, and the investigation should be commenced while the epidemic is in progress, and completed after it has ceased. On Monday there were but fifteen deaths in New Orleans.

We shall look with interest to see the effect of the present cool weather upon the further progress of the disease. There can be little doubt that the epidemic is approaching its end.

— A letter from Brazil states that out of seven hundred men engaged in building a railroad from Madeira River to Bolivia but ten were on the sick list, though it was the "unhealthy season." They were mostly from the United States. The temperature in the sun often rose to 120°, but not a case of sun-stroke occurred. "No one here," says the writer, "has ever seen a case of sunstroke in the tropics."

— A correspondent from Chicago writes: Early last spring Dr. Edwin Powell introduced into the surgical wards of Cook County Hospital — our large public hospital — the Lister process of surgical dressings. He had remarkable success with it during the three or four months he was on duty. Pyæmia was for the time banished. When the old medical board was legislated out of office by the Board of County Commissioners, the Lister process went out likewise. But the experience with surgical cases since the beginning of July has been so unfortunate that the new board has compelled the

authorities to incur the necessary expense for apparatus, and the process is to be introduced forthwith. As one of the attending surgeons recently said, it has come to this, that a capital operation in the hospital almost means death.

The unfortunate fact is, our great public hospital, so nearly new, and so beautiful to look at, is a reeking hot-bed of hospitalism. Who is responsible? There are three causes: complication in architecture, bad construction, and political management. Antiseptic surgery offers the only available present remedy,—and this is but a partial remedy.

— It is a matter of great annoyance that many exchanges come to us in a hard, tight roll, enveloped from end to end with exquisite care in tough paper, often in triple folds. To fold a journal once lengthwise, attach a simple label, and omit the wrapper is quite enough, and saves the recipient time and vexation. Moreover, in this shape it is more conveniently read, and will lie flat.

— Victims of "hay fever" will be interested in the conclusions of Dr. Woodward, of Worcester, who has made careful microscopic examinations of nearly one hundred plants, and in a communication to the United States Hay Fever Association states that in no plant accused of being productive of summer catarrh has he found pollen of any other shape than globular; that to his surprise, notwithstanding he worked over these plants nearly four weeks, and in spite of the profusion of pollen which lay in all directions upon his books and papers, he did not experience a single symptom of catarrh until the arrival of the dreaded 20th of August. He therefore concludes that the disease is in his system; that no irritation will cause it to appear before the appointed time, but that after that date irritants of any sort will aggravate and increase it. Dr. Beard, of New York, agrees with him. Dr. Marsh, of New Jersey, holds the opposite opinion. In a recent number of the Boston *Daily Advertiser* Dr. Woodward's letter will be found in full.

— Meconiosin is the name of a new derivate from opium. It crystallizes in leaf-like masses, but its therapeutic nature and ability have not yet been decided.

CASES OF DIPHTHERIA TREATED WITH SALICYLIC ACID, CHLORATE OF POTASH, AND DIALYZED IRON.¹

BY HALL CURTIS, M. D.,
Visiting Physician, City Hospital.

CASE I. W. S., single, twenty, laborer, entered City Hospital January 2d. Usually healthy. Ten days before entrance he awoke with severe sore throat and headache, followed by frequent vomiting, epistaxis, and diarrhoea.

January 3d. At visit the fauces were much swollen, and deeply congested, cracked, and bleeding. There was also aphonia. Temperature, A. M. 101°; P. M. 103.2° F. He was ordered acidi salicylici, potassae chloratis, of each five grains in solution every two hours. Throat to be gargled the alternate hours with same mixture and twenty grains ferri dialysati at same time. Steam was turned into his room. He was freely stimulated, and had liquid food every two hours.

¹ Reported to the Boston Society for Medical Improvement.

January 4th. Throat was still very painful. Poulticed. Temperature, A. M. 101.2°; P. M. 103.2°. His condition gradually improved, the temperature falling till it became normal on the 8th of January. The throat was well on the 13th, and the man discharged well on the 25th.

CASE II. J. T., single, fifty-five, sailor, entered January 8th. No history of syphilis; had been drinking freely for a week past, and slept in a cold room. At visit there was great prostration, with marked loss of power in legs. A shallow ulceration of the side of the palate; also of tonsil and posterior fauces of left side; covered with a thick grayish membrane. The same treatment was used as in former case, and in addition the throat was painted with compound tincture of benzoin. Temperature 101°.

January 10th. Membrane detaching, and less thick.

January 13th. Left tonsil free. Membrane thinner on palate and fauces; ulceration healing. Temperature 99.7°.

January 18th. Up and dressed. Membrane entirely gone. Ulcerated surface less distinct.

January 25th. Pulse 82; temperature 98°. Discharged to Soldiers' Home.

CASE III. S. C., eighteen years, domestic, entered hospital February 6th. Is a very healthy and strong woman. Three days before entrance was taken with headache, backache, and sore throat. The next day was hardly able to swallow or speak. At visit there was prostration, dyspnoea, and partial aphonia; the face and neck flushed and swollen. The uvula and tonsils enlarged and covered with a dirty white membrane. Pulse 114; temperature 101.6°. The same treatment as in the other cases, the atomizer being used in place of the gargle. Steam; poultice to throat; food and stimulants freely.

February 7th. A. M. Pulse 106; temperature 101.1°. P. M. Pulse 114; temperature 101.2°. Sat up all last night without sleep. Lower left back less resonant than right; dry râles through each. At 11.30 P. M. dyspnoea had increased. Pulse 138; temperature 103°. Tracheotomy was done by Dr. Cheever at one A. M. The rest of the night she breathed easily, and though quite restless slept. Stimulants freely given, and treatment continued.

February 8th. At 7.30 A. M., pulse 146; temperature 103.5°; respiration 36. At visit, membrane on right tonsil had diminished, and was flaking off the left tonsil and uvula. She was unable to swallow; nourished per rectum. Died at 2.30 P. M.

CASE IV. N. N., five years old, sent to the hospital from the House of the Good Samaritan, where she had been under treatment for caries of the spine. Entered hospital February 11th. Her throat is generally congested, a patch on left tonsil, and one on posterior wall of fauces; breathes easily. Pulse 120. Ice-bag to throat, steam in room, iced milk every hour.

R <small>y</small>	Acidi salicylici,					
	Sodæ bicarb.					ss. 3 ss.
	Syrupi .					3 iv.
	Aquæ .					q. s. ad 3 vi.
R <small>y</small>	Potassæ chloratis					gr. xv.
	Aquæ .					3 i. M.
Half a drachm of each every two hours.						

Throat to be atomized with same every hour. Dialyzed iron five drops every other hour.

February 18th. Had a good night. Pulse 120; temperature 100°. Urine examined: color pale yellow; specific gravity not given; reaction acid; coloring matter increased; no albumen; considerable sediment; uric acid, and amorphous urates.

February 20th. A. M. Pulse 108; temperature 99.6°. P. M. Pulse 132; temperature 99.8°. Membrane has spread to right side, and is now thick. Glands on left side of neck much swollen. Profuse bloody discharge from nose. Throat atomized every half hour. Nostrils to be syringed at same time. Ten drops of brandy every two hours. Urine: color normal; reaction acid; specific gravity 1035; no albumen; sediment epithelial; granular and hyaline casts; uric acid and mucus.

February 21st. Membrane fully as prominent. Child takes food well. Pulse 125; temperature 99.2°. P. M. Pulse 128; temperature 99°.

February 22d. Weaker. Membrane becoming detached.

February 23d. Pulse 116; temperature 99.3°. P. M. Pulse 120; temperature 99.5°. Membrane on left tonsil partly gone; quite loose on uvula and right tonsil; throat generally less inflamed.

February 24th. Vomits; brandy omitted.

February 25th. No vomiting; brandy resumed. Membrane nearly gone.

February 26th. Refuses food, but will take ice-cream.

February 27th. Now drinks milk again. Urine, color pale; acid. Albumen three fourths of one per cent.; fine granular casts; pus; squamous and sound epithelium; urate of ammonia crystals.

March 1st. Still a very little membrane on soft palate; fauces still congested. Is hungry.

March 8th. Temperature 98.1°. Is well. Discharged.

CASE V. S. F., five years old, a delicate, strumous child, living in a sunny and healthy house, was seen on the 28th of March. He complained of general malaise. The throat was congested. Pulse 144; respiration 20; temperature 102.5°. Five P. M., pulse 112; respiration 40; temperature 103°.

March 29th. Delicate film of membrane on right tonsil. A. M. Pulse 120; respiration 32; temperature 101.2°. P. M. Pulse 112; respiration 28; temperature 102°. Same treatment as in last case: ice-bag to neck, steam in room, milk broth or ice-cream every hour.

March 30th. Both tonsils covered. Cervical glands on each side enlarged. A. M. Pulse 120; respiration 32; temperature 101.8°. P. M. Pulse 120; respiration 36; temperature 101.8°.

March 31st. Soft palate and posterior wall of fauces now covered with membrane; epistaxis; bronchial rales through each lung; ringing and teasing cough; face slightly swollen. Slight haze of albumen in urine. A. M. Pulse 120; respiration 28; temperature 99°. P. M. Pulse 128; respiration 40; temperature 101°.

April 2d. Eruption of measles appeared on face this P. M.

April 3d. Eruption has spread over body. Soft palate and posterior wall free from membrane. A. M. Pulse 104; respiration 28; temperature 99.5°. P. M. Pulse 120; respiration 28; temperature 101.5°.

April 5th. Glands less prominent. Membrane breaking up on tonsils. Of-

fensive and sanguous discharge from nose. Nose atomized with above solution of acid and potash.

April 7th. Membrane has entirely disappeared from throat: eruption of measles has faded from upper third of body. Slight diarrhoea.

From this date convalescence was uninterrupted, excepting a subacute inflammation of the glands on left side of neck, and child *walked out* on the 19th of April.

The *first* case had been sick ten days without treatment, and though there was no membrane the throat presented the appearances characteristic of its fall. His great prostration and slow recovery showed it was not an ordinary inflamed throat.

There was no history of syphilis in the *second* case, and the throat readily responded to the treatment.

In the *third* case the membranes were thinning and flaking off after two days of the treatment.

In the *fourth* case a puny child with caries of spine recovered after a long fight.

The *fifth* case was a very delicate boy, and with a complication of measles.

Excepting the third case they all did well, and so far as is known there is no paralysis.

P. S. The last case had paralysis of muscles of pharynx and legs, readily yielding.

SHORT COMMUNICATIONS.

ABSTRACT OF SANITARY REPORTS RECEIVED DURING THE PAST WEEK UNDER THE NATIONAL QUARANTINE ACT.—No. XL

OFFICE SURGEON-GENERAL U. S. M. H. S., WASHINGTON, *September 21, 1878.*

VICKSBURG.—Epidemic abating. There were 121 deaths during the week ended yesterday evening, a decrease of 113 deaths from the week before. Eleven deaths occurred in the last twenty-four hours. Total deaths to date 721.

NEW ORLEANS.—During the week ended yesterday noon there were 1401 cases of yellow fever, and 445 deaths, a decrease of 172 cases and 85 deaths as compared with previous week. In the last twenty-four hours reported there were 165 and 69 deaths. Total cases 7538, deaths 2368.

BATON ROUGE, LA.—The first case of yellow fever reported to the Board of Health occurred on the 14th of August. A previous case, not reported to the board, but thought to have been yellow fever, occurred August 10th. First death August 18th. To nine A. M. yesterday there had been 672 cases and 39 deaths.

MORGAN CITY, LA.—During the week ended yesterday evening there were 41 cases of yellow fever and 10 deaths, making in all 66 cases and 18 deaths.

MOBILE, ALA.—Four cases of yellow fever and two deaths occurred during the past week, making in all six cases and four deaths.

GRENADE, MISS.—For the week ended yesterday evening there were 20 new cases and 37 deaths. Total deaths to date 271. No decrease in virulence of the fever. Dr. Henry Stone, of Natchez, is the only physician on duty.

PASS CHRISTIAN, MISS.—From September 9th to 20th, A. M., there were six new cases of yellow fever and no deaths. Total cases 21, deaths one.

BILOXI, MISS.—Twenty cases of yellow fever and seven deaths have occurred to September 20th.

OCEAN SPRINGS, MISS.—There were 14 cases of yellow fever and three deaths for the week ended yesterday evening. Total cases 51, deaths 12.

MEMPHIS. — Six hundred and twenty deaths from yellow fever occurred during the week ended Thursday evening, September 19th, making a total of 2131 deaths. The number of cases not known to Memphis Board of Health.

BROWNSVILLE, TENN. — During the week ended yesterday evening there were 100 cases of yellow fever and 15 deaths, making in all 130 cases and 44 deaths. The deaths for the week ended September 14th were 29, instead of 9, as stated in last report.

HICKMAN, KY. — Forty-two deaths from yellow fever occurred during the week ended yesterday evening. Sixteen new cases and three deaths during the last twenty-four hours. Total cases to date 205, deaths 74.

ST. LOUIS. — During the past week there were six deaths from yellow fever, four of which were at quarantine. All refugees.

LOUISVILLE. — Eighteen cases of yellow fever and eight deaths for the week ended yesterday evening. Total cases 77, total deaths 26; all refugees.

CINCINNATI. — Five cases of yellow fever and one death during the week ended yesterday evening; all refugees. Total cases 30, deaths 13.

GALLIPOLIS, OHIO. — Since the last report, to September 18th, there was one new case of yellow fever and three deaths, making in all 28 cases and 12 deaths, all traceable to the infected steamer John D. Porter.

INDIANAPOLIS, IND. — One refugee died of yellow fever September 17th.

BAY ST. LOUIS, Miss. — Fifteen new cases of yellow fever occurred during the last week. Deaths not reported.

CAIRO, ILL. — Three new cases yellow fever since last report. Two died in Cairo, and one went to Mound City, eight miles from Cairo, and died there.

HAVANA. — Fifty deaths from yellow fever and four from small-pox during the week ended September 14th.

KEY WEST, FLA. — Six cases of yellow fever and five deaths during past week.

MOROCCO, AFRICA. — Asiatic cholera has appeared in the cities of Mequinez and Fez, Morocco, causing the death of from 20 to 30 victims daily in the former city, which is about 170 miles from Tangier. Information of the disease came to Felix A. Mathews, consul of the United States at Tangier, and in his capacity as president of the Board of Health of Morocco he dispatched Dr. Tadeo Martinez, formerly of the Spanish navy, to visit Fez and Mequinez. Dr. Martinez left Tangier August 7th with an escort of 200 Moorish troops, and, after forcing his way through the lines of revolutionists besieging Mequinez, entered that city on the 14th of August, where he found the disease to possess all the well-known characteristics of Asiatic cholera. From a report obtained from the custodian of the Jewish cemetery, the number of deaths of the Israelites since the first appearance of the disease exceeded four hundred. The disease was reported to have spread to Sherarda, a province bordering on the city of Mequinez. Dr. Martinez attributes the disease to the unsanitary condition of the city, but Consul Mathews suggests the possibility of the germs of disease having been brought by the thousands of pilgrims returning from Mecca. The unsanitary condition of the crowded cities of Fez and Mequinez is described as "entire want of precautionary measures of cleanliness within and without the houses. In some quarters offals, filth, dead animals, and dirt of all kinds and origin are allowed to accumulate from year to year until they reach the level of the windows, creating inexpressibly repugnant exhalations of the most deadly and life-destroying miasm." The port of Tangier and its environs are free from any infectious disease.

CALCUTTA. — Nine deaths from cholera: week ended July 20th.

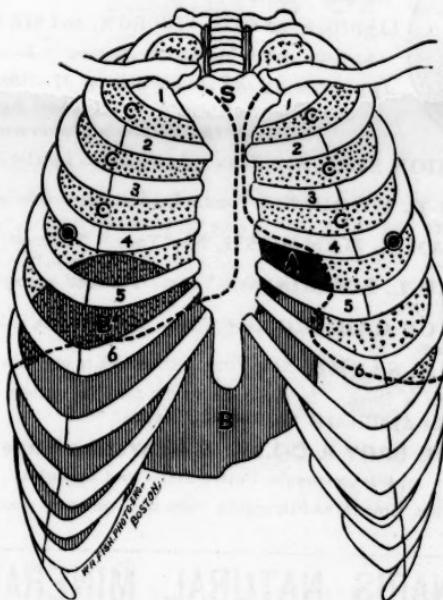
BOMBAY. — Thirty deaths from cholera: week ended July 30th.

JOHN M. WOODWORTH,
Surgeon-General U. S. Marine Hospital Service.

JOHNS HOPKINS UNIVERSITY, BALTIMORE. — *Preliminary Medical Course.* — *Chemistry, Physics, and Biology, with French and German.* — The Johns Hopkins University will organize at the commencement of the session 1878-79, a course of instruction preliminary to the study of medicine. This course will have the object of giving the student a liberal education, but one rather scientific than literary, and including a thorough knowledge of the structure and functions of the human body in health. At its completion, the student will be pre-

DIAGRAM I.

NORMAL THORAX.



■ A — Physiological area of percussion flatness of the heart on expiration.

■ B — Liver.

■ C — That portion of the liver which is covered by the right lung.

■ D — Lung.

S — Sternum.

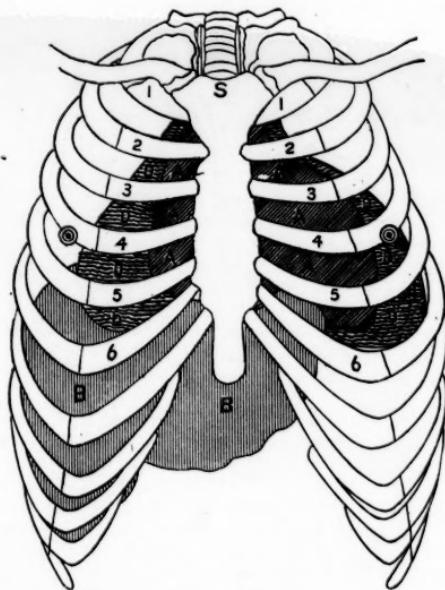
○ — Nipple.

1, 2, 3, 4, 5, 6 — Ribs.

- - - Broken line — Border of lung.

DIAGRAM II.

THE LUNGS HAVE BEEN REMOVED.



■ A — Normal shape of the heart in its pericardium.

■ B — Liver.

■ D — Effusion.

A+D — The shape which the pericardium assumed, in a case where considerable fluid had been introduced into the sack.

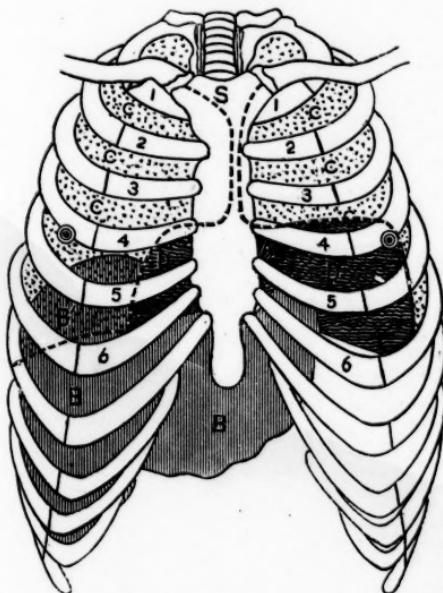
S — Sternum.

◎ — Nipple.

1, 2, 3, 4, 5, 6 — Ribs.

DIAGRAM III.

A SMALL AMOUNT OF LIQUID HAS BEEN INTRODUCED INTO THE SACK.



■ A — The portion of the area of flatness which is still caused by the physiological flatness of the heart.

■ B — Liver.

■ C — That portion of the liver which is covered by the right lung.

■ D — Lung.

■ E — Effusion.

A + D — Area of percussion flatness found when the effusion is small.

S — Sternum.

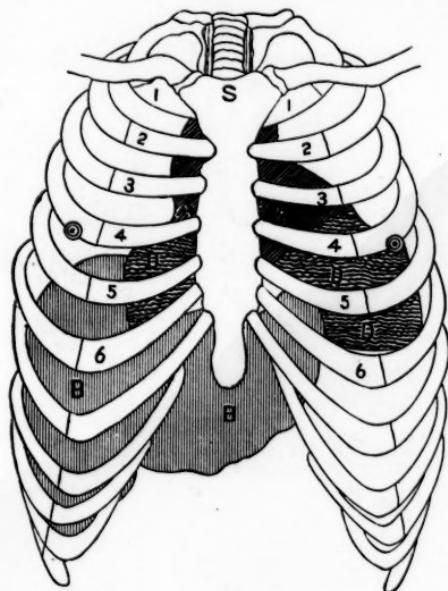
◎ — Nipple.

1, 2, 3, 4, 5, 6 — Ribs.

--- Broken line — Border of lung.

DIAGRAM IV.

REPRESENTS DIAGRAM III. WITH THE LUNGS REMOVED.



■ A—A portion of the normal heart inclosed in the pericardium.

■ B — Liver.

■ D — Effusion as it appeared in the sack, the cocoa butter being in small amount, and the lungs having been removed, after the butter had hardened.

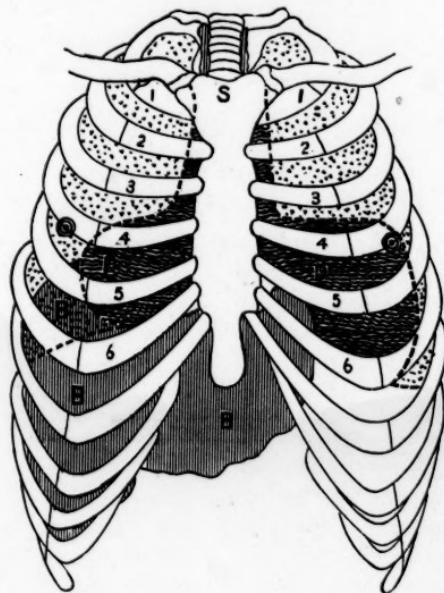
S — Sternum.

◎—Nipple.

1, 2, 3, 4, 5, 6 — Ribs.

DIAGRAM V.

A LARGE AMOUNT OF LIQUID HAS BEEN INTRODUCED INTO THE SACK.



■ **B** — Liver.

■ **b** — That portion of the liver which is covered by the right lung.

■ **c** — Lung.

■ **d** — The area of percussion flatness caused by a large effusion.

S — Sternum.

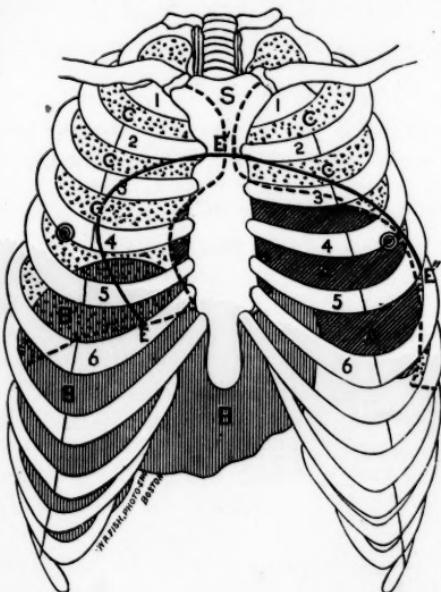
◎ — Nipple.

1, 2, 3, 4, 5, 6 — Ribs.

— — — Broken line — Border of lung.

DIAGRAM VI.

ENLARGED HEART.



■ A — Area of percussion flatness caused by an enlarged heart.

■■■ B — Liver.

■■■ B' — That portion of the liver which is covered by the right lung.

■■■ C — Lung.

E E' E'' — The line marking the area of relative dullness of the enlarged heart.

S — Sternum.

◎ — Nipple.

1, 2, 3, 4, 5, 6 — Ribs.

--- Broken line — Border of lung.